



## May 2007 Issue #17

This newsletter is sent out to all who have called in on the AWA net and who have email facility, and those who have paid for mail envelopes, with the hopes that it will encourage you to call in again and help to keep the AWA net alive and well.

With some of the money gathered from sales of donated goods to the AWA, we are now able to pay for envelopes and mailing of the newsletter to almost all who want it.

Should you not want to receive any further publications of this newsletter, drop me a note and I will take you off the mailing list.

### **Happenings:**

Well the open day at Rand Airport turned out to be a great success. Estimates between 80-100 people are not too far fetched, and from the sounds of the feedback gathered, a good time was had by all.

Unfortunately we were not able to get the control station up and running due to the shortage of an antenna, but I do believe that Dudley Z22JE, took over the reigns and handled the net admirably. Well done Dudley.

The flea market, although small, was well attended and of all the goodies that I took along for the AWA, I only went home with 1 small box of leftovers. Thanks to all who took the time to attend, for their support. We really appreciate it.

The display of antique rigs was also well worth viewing. If there was to be a competition for the best looking rig, it certainly would have gone to Rad ZS6RAD for his finely restored SX28. It certainly drew a lot of attention, including that of a few ankle biters who took great joy in twirling the knobs on this fine specimen. Much to Rad's dismay.



**Rad ZS6RAD SX28**

**ZS0AWA/CW.**



Heard on frequency this last month has been Barrie ZS6AJY, Ian ZS5IAN, Clive ZS6AVP, Ben ZS5SIB, Denis ZR6DNS. Join us on Saturday afternoons at 14:00 SAST. The net is run at  $\pm 12$  wpm and so should meet the needs of all interested in CW. 7020 is the frequency. Wanting to upgrade to full ZS, here's your opportunity to do some slow CW and get some practice in.

**AM Net:**

Please come up and join us if you have the time and the inclination. 19:30 Wednesday evenings and 06:00 Saturday mornings on 3615. We have changed the time on Saturday's due to the band opening a bit later as the winter months approach and the sun raises it's head a bit later every day.

Wednesday evenings have been a bit of a disaster, with the band just closing on us shortly after starting the net. Although, when it has been open, conditions have not been too bad at all. So roll on sunspots.

The Saturday morning net has been well attended. Heard on frequency this month have been Gary ZS5NK, Rod ZS5RK, Don ZS5DR, Munro ZS5IN, Rad ZS6RAD, Barney ZS6BLL, Willem ZS6ALL, Denis ZR6DNS, Brian ZS2AB, Garth ZS6SUN and yours truly ZS6ADY.

Should you happen to know of another AM net running, or come across one, let us know the times and frequencies that these happen so we can publicize them. I am sure there will be a few ardent listeners out there.

**SSB Net:**

The SSB net continues to grow in numbers as the band improves. More and more new callers coming, in and some of the guys that haven't called in for a while. So keep it up. Pass the word around that you do not have to specifically be running antiques to join the net, although it would be nice, but to have an interest in the restoration of these fine old boat anchors.

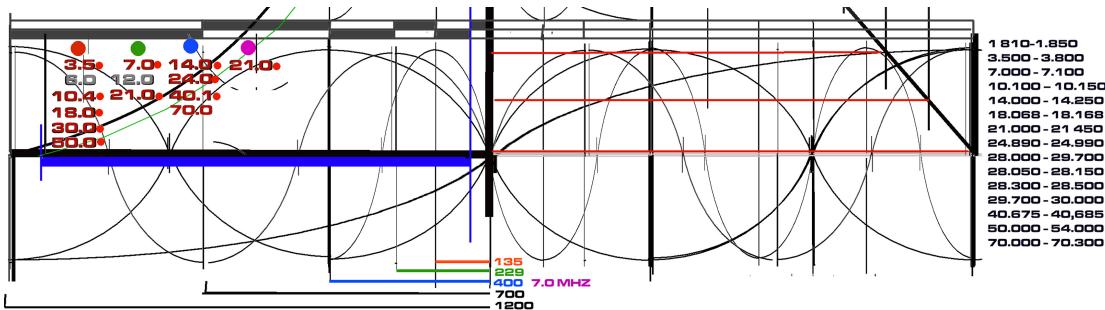
We appeal to all of you, when calling in on 40m, should you not be able to hear the control station, try letting someone know who you can hear and you know can hear the control station. It's better than doubling over everybody.

## Continuation of ZS6BIR Antenna Project.

.....no problem. I am sure that those of you that are using automatic ATU's will be able to tune it right in. As it was, it took about a month of playing to get the virtual elements to come in at exactly 24, 28-31, 40, 50 and 70 Mhz.

*So, where do the virtual elements come from?*

Consider the design sketch below.



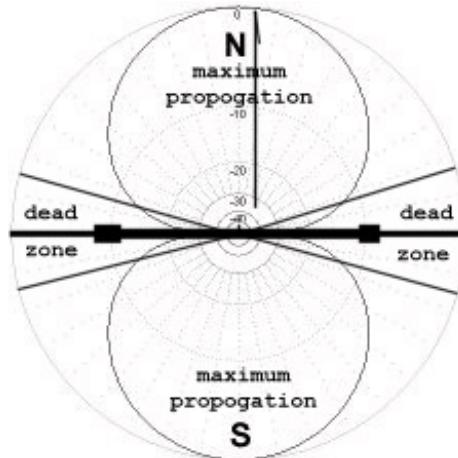
When one has a  $\frac{1}{4}$  wave dipole it will resonate its appropriate wavelength. It will however also work for higher frequencies and will become resonant at  $\frac{3}{4}$ ,  $1\frac{1}{4}$ ,  $1\frac{3}{4}$ ,  $2\frac{1}{4}$ , etc wavelengths. ( $1/4, 3/4, 5/4, 7/4, 9/4$ ) This progression follows a mathematical ratio of  $fr/.58$  where  $fr$  is the fundamental frequency. Ie.  $14/.58 = 24$  and  $24/.58 = 40$  and  $40/.58 = 70$  and so you have an antenna that will work at 14, 24, 40 and 70 Mhz. Likewise, an antenna cut for 3.5 will work at 6, 10, 18, 30 and 50 Mhz. So, if my 30 Mhz virtual dipole is resonating at 31 Mhz, it means that my 3.5 Mhz actual element is a bit 'long' and it is, because it is set for a fundamental of around 3.6 Mhz which, if you follow the .58 progression takes us to 6.2, 10.6, 18.3 and on to 31.5 Mhz. One may find the actual frequencies a little above or below where the maths predict they should be but this is due to feedline variations, coil characteristics, interaction between the elements and proximity to the ground. But, in a nutshell, that is where the virtual elements come from.

The 4 Element Multibander weighs around 7 Kg and costs around R500.00 if you make it yourself. It can be constructed using materials readily available from the local hardware shop and occupies a space 2.5 Meters x 5 Meters when deployed. The only special fabrication that needs to be done is to turn the threads off the threaded bar on a lathe so that it slides neatly into the 10mm alum. tube. An engineering firm will do that for about R 100.00 but then, most of us know someone with a lathe that will do the job for a six-pack. The entire antenna unscrews and comes apart to fit in a bag 1.3M long by 0.3M in diameter. This makes it a perfect traveling antenna to take on a plane, car or boat or even up the side of a mountain in your backpack on an expedition.

For those of you who are not so mechanically minded, call me and I will be quite happy to help you make one and set it up for you.

Points of consideration for assembly and use.

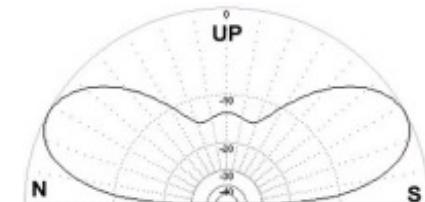
\* *The array is directional and will propagate poorly along the axis of the dipole. The ‘dead zone’ is however small (20%) as opposed to the coverage area (80%)*



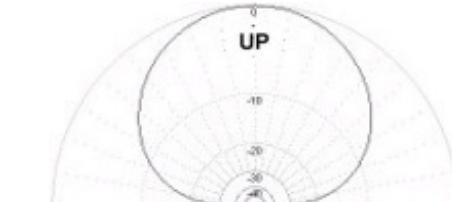
\* The natural resonant peaks are very sharp and SWR will climb quite sharply as you go off the natural resonant frequency of the dipole element.

\* The thing to take care with during construction is that the coils must be identical or else your SWR won’t come down as low, but your SWR dip will be broader. Use of an inductance meter and/or antenna analyser during assembly is highly recommended

\* Height above the ground is important and if you wish to work regional stations, high angle propagation is achieved with the antenna mounted 4-8 meters which gives about a 3dBI gain. When working DX stations, the antenna should be  $\frac{1}{2}$  wavelength above the ground, which will in turn give you up to 8dBI gain with low angle propagation.

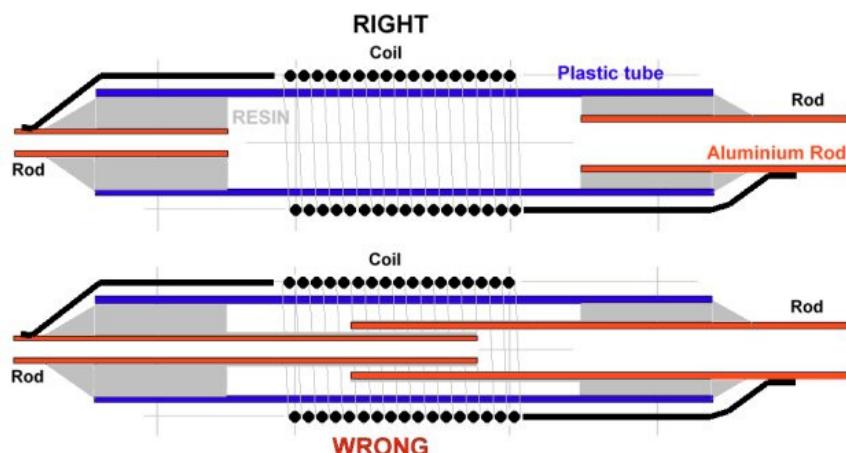


$\frac{1}{2}$  wavelength above ground  
+- 8dBI gain



close to the ground  
+- 3dBI gain

\* Do not slide the two rods inside each other!!!! The inter element capacitance will mess you around no end and they may short out eliminating the effect of the mid loaded coil!!!!



\* My antenna is made with a 6mm solid rod and a 10 mm tube and as you can see from the picture it has a bit of a droop towards the tips. (Although the flexibility of the plastic tube also contributes a bit to the droop. I used 20mm diameter x 1mm wall thickness PVC conduit tubing for the coil former. You are quite welcome to use a stronger stiffer material for the coil formers.) Using a 10 mm and a 15 mm tube for the two elements will make the elements straighter with a very small weight penalty. One can therefore make the antenna dipoles with 6/10 mm, 10/10 mm, 10/15mm or even 15/15mm rods depending on availability of materials.

\* After final setup, I wrapped each coil in a different colour insulation tape, sealing it against the weather and making each one easily identifiable. Coating the threads with a thin layer of anti-rust agent will make the antenna easy to take apart should disassembly for maintenance or relocation become necessary after a few years. Something like 'Coppaslip' or a spray on oil is recommended. A thick coating will 'dry out' leaving a hard to remove crust and as the threaded section is inside the coil, you wont be able to get to it to clean it off. You will then most probably break the plastic coil former trying to unscrew the element.

Please do not hesitate to contact me should you have any further questions regarding this design.

Best Regards

Mike Brink.

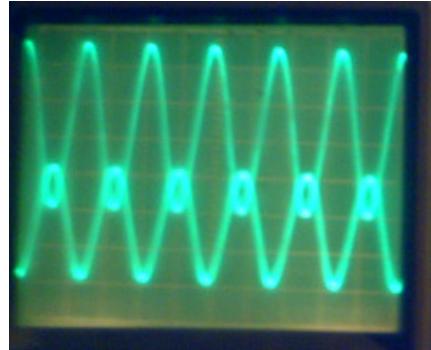
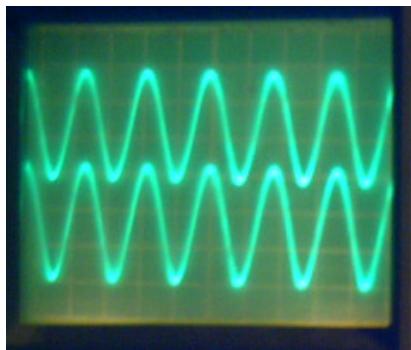
[zr6bri@webmail.co.za](mailto:zr6bri@webmail.co.za)

© Mike Brink. 2007. All aspects of the design as described in this article are copyrighted and the author's permission is given for the design to be replicated by other amateurs for personal use. This design may not be produced for commercial use without the permission of the designer.

*A footnote on the FTU.*



*My home built FTU is connected inline between the HF transceiver and the antenna. It has a voltage (bottom right) and a current (top right) sensing output which are fed to an oscilloscope. There are four switches to switch the four coils in and out of circuit in a binary sequence and I use my 'scope to check the phase relationship between the voltage and the current. On top are the Voltage and Current calibration knobs.*



The first image shows the voltage and current in phase and the current trace is calibrated to equal the voltage trace into a 50 ohm dummy load. The second image shows the voltage and current completely out of phase into a mismatched load and the voltage trace is larger than the current trace to show that the impedance is out as well. In this way, I use my 'scope as a SWR meter. It allows me to simultaneously monitor the modulation envelope and signal distortion. (Signals were generated by the MFJ antenna analyser at about 100 mW but the FTU will work up to 400W.)

### **Restoration News:**

There are a few projects going on as far as restoration is concerned. Rad is busy with a Viking Ranger II which he recently acquired. Andy is busy with a Viking Ranger I and SX 28. Don has a Viking II and Halicrafters SX160 that he is tackling and Rod has a few new toys to play with as well. Richard ZS6TF is busy with an R1155 and T1154 and is looking for any parts you may have.

### **Swap Column:**

Any swaps or items for sale in the antique line ? Let me have the details and we will advertise it here.

There is an online swap shop on the website of the Highway Amateur Radio Club for ALL amateurs and interested parties to use - it is not restricted to members only. We have been invited to make use of this facility too. Should you want to, use the link to the HARC at the end of the page to take you to their website.

If you would like to forward this newsletter to any other interested parties, please feel free to do so. Print it out and put in on your club notice board, or give it to someone interested in valve radios. If you know of any who report in on the net but don't have email, print it out and give them a copy.

### **Net days and times:**

Saturday 05:30 AM Net – frequency 3615Mhz  
Saturday 08:30 SSB net - frequency – 7070Mhz  
Saturday 14:00 CW net – frequency 7020Mhz  
Wednesday 19:30 AM net – frequency 3615 (-5 for QRM)

This, and past copies of the AWA Newsletter can be downloaded from <http://members.harc.org.za/newsletters/AWA/>. Our thanks to the Highway Amateur Radio Club in Durban (<http://www.harc.org.za>) for providing this service to our members and other interested parties.

**Thanks:**

Those of you who are in tune with the news may be aware that I received the Gary Immelman RA Heritage award at the SARL AGM this year. I am still not sure what it was for, but looking at the award itself on the SARL website, I would assume it is for the articles that have been written on Antique Wireless. To those who nominated me for this award, I thank you, it is greatly appreciated.

Thanks too for all the positive comments received about the newsletter. The only negative ones so far have been around the size of the letter coming in to mailbox's. With this issue, I will be sending out B&W copies of the newsletter to all members who have called in on the AWA net. If you want any back copies, you will have to pay for them.

Thanks for the bandwidth.

DE ZS6ADY FOR ZS0AWA